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SHORT DIGITAL STRESS SCALE - PSYCHOMETRIC PROPERTIES AND CROSS-CULTURAL VALIDATION

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Research in Progress

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Abstract

Due to the massive, global, and seemingly unabated growth in mobile and social media use, across private and work lives, users likely experience perceived digital stress, which might undermine important behavioural outcomes. Hall et al. (2021) have established a digital stress scale (DSS), developed among U.S. adolescents and young adults; the current study offers a cross-cultural test of the scale and proposes a shortened version, by almost 60%. Social media use tends to blur work and nonwork spheres, and psychometric scales need to be cross-culturally valid, so the present study tests perceived digital stress among employees from three countries. The well-established validation procedures and samples from Germany, Italy, and Japan affirm the reliability, validity, and cross-national applicability of a 10-item short DSS. The extended application also reveals the impact of perceived digital stress on three sets of employee outcomes. In turn, this research offers implications for both IS research and practice.

Keywords: Digital Stress, Short Scale, Social Media, Cross-Cultural Validation

1 Introduction

As compellingly put by Michael Harris in his 2014 book The End of Absence, smartphones allow people to immerse themselves in online life but also make them less free and more stressed because they have lost the ability to disconnect from other people. Facebook, WeChat, TikTok, Clubhouse, etc. – the list of social media platforms (SMPs) used worldwide is increasing, and so is the number of users and the time they spend on SMPs and the mobile Internet more generally. In the United States for example, adults spent 5.5 hours daily in 2022 on their mobile phones (Petrov, 2023) and over the past five years, the average mobile internet usage time rose from 2.16 hours in 2017 to 3.28 hours in 2022, and similar increases appear in many other countries, such as Germany (+75%), Italy (+16%), and Japan (+26%) (Hootsuite and We Are Social, 2018, 2023). This increase results partly from people's constant access to mobile devices, which also facilitates the convergence between their private and work-related mobile and social media use and ultimately leads to a blurring of these life spheres (Marsh et al., 2022).

With the continuing integration of technology into everyday life, "technostress" has been a topic of research for quite some time. Technostress, which is defined as "a modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner" in work environments (Brod, 1984, p. 754), has been shown to affect various work-related outcomes (e.g. Pirkkalainen et al., 2019; Ragu-Nathan et al., 2008; Tarafdar et al., 2015). Technology may also negatively affect the private

sphere in which case it is refered to as "techno-invasion" (Bauwens et al., 2021). Hall et al. (2021) extended the technostress concept by suggesting that technology use and its negative effects are not limited to the work sphere but transcend all areas of life. Moreover, they acknowledge that technology-related user behavior evolves concomitant with technological developments. Hall et al. (2021) introduce the concept of perceived digital stress (DS) which is defined as "the stress and anxiety associated with notifications of and use of information and communication technologies enabled by mobile and social media" (p. 231). Building on this definition, Hall et al. (2021) developed a five-dimensional 24-item digital stress scale with the following dimensions: availability stress, approval anxiety, fear of missing out, connection overload, and online vigilance. Their scale development was based on samples of U.S. adolescents and young adults. Interestingly, so far, the uptake of the scale has been slow and existing applications of the scale are based on student samples (e.g. Xie et al., 2022), which raises generalizability concerns. Heeding Hall et al.'s (2021, p. 240) call for research that examines the DS scale "and its associations with psychosocial outcomes in more diverse samples", we assess the scale's cross-cultural applicability, using employee samples from three countries—Germany, Italy, and Japan. This focus is warranted because social media increasingly blurs the boundary between private and work life and because past research shows that employee stress in the workplace can be induced by technology characteristics (e.g., Becker et al., 2020; Marsh et al., 2022). Also it is likely that employees compared to students typically have different daily demands on their lives which contribute to the occurrence of digital stress (Waycott et al., 2010), thus warranting an assessment of the DSS in relation to employees. Moreover, in an effort to increase the DS scale's practical usefulness, we investigate whether scale length can be reduced without sacrificing key psychometric properties. The IS and management literature in particular, advocate that measurement scales should generalize to cultural contexts other than the ones in which they were developed (e.g., Sin et al., 2005; Walsh et al., 2019). Also, the length of the full 24-item DSS may hinder its application in research and practice because long questionnaires lead to lower response and higher dropout rates (Walsh et al., 2019).

Overall, the goal of this study, which is part of an ongoing research project, is to develop a valid and reliable short form of the Hall et al. (2021) DSS that is cross-culturally applicable to employees. We believe this research is important conceptually and practically. Conceptually, confirming the applicability of the full and short DSS to different countries might prompt further research into the DS construct and its private life and work-related correlates. Practically, a valid DS measure that is short enough to be used in surveys could be more useful to IS practitioners.

2 Perceived Digital Stress: Construct and Scale

The confluence of private and work lives and the concomitant increase in social and digital media use usher in a problem that can adversely affect employee well-being and performance—perceived DS (Hall et al., 2021; Steele et al., 2020). DS arises from private and professional use of digital media and prior research suggests it can negatively impact both behavioral outcomes (job performance, job commitment, etc.) and people's physical and mental health (Büchi et al., 2019; Reinecke et al., 2017). Hall et al. (2021) recognized the importance of DS-outcomes and developed a scale that maps the conceptual properties of the perceived DS construct.

Hall et al. (2021) developed the 24-item DSS in the U.S. using four studies; their samples comprised of adolescents and young adults. In validating the DSS, Hall et al. (2021) found correlations with psychological outcomes such as depression or anxiety. All five DS factors showed good internal consistency, with Cronbach's alpha (α) values ranging from .85 to .93, and factor loadings with values between .65 and .96.

The present study aims to validate the full and a shortened DSS for three culturally distinct countries, Germany, Italy, and Japan, and among an important target group, employees. The three countries are among the wealthiest in the world and have very high social media penetration rates (Internet World Stats, 2022; U.S. Central Intelligence Agency, 2022). However, the three countries differ in terms of annual work hours; employees in Italy and Japan work an average of around 1,600 hours per year, compared to 1,331 in Germany (OECD, 2021). Perhaps more importantly, Germany and Italy are more

individualistic and Japan is a more collectivistic country (Hofstede, 2023). Past research suggests that people from individualistic vs. collectivistic countries use social media differently (e.g., Sheldon et al., 2017).

3 Scale Assessment and Shortening

The scale-shortening and validation process comprises four broad steps: (1) content validity, readability and item-discriminant validity assessment; (2) assessment of psychometric properties; (3) invariance testing and (4) criterion validity assessment. Toward the development of the DS short scale, we followed recommendations in the literature (e.g., Nenkov et al., 2008; Walsh et al., 2019) and applied judgmental, internal and external criteria. Judgmental criteria are concerned with the assessment of content validity (i.e., the degree to which the scale content adequately reflects the construct being measured; Haynes et al., 1995) and readability, internal criteria relate to a construct's internal consistency (i.e., homogeneity of the items in the three DSS dimensions) and dimensionality and, external criteria are concerned with construct validity, which refers to "a match between empirical and theoretical relations" regarding the focal construct and its theoretical correlates (Borsboom et al., 2004, p. 1064). As to the judgmental criterion, two scale experts in each country appraised the suitability of the translated items and readability tests on the items were performed in all three countries (Studies 1.1-1.3). Then, surveys with the full 24-item DSS and work-, family- and domain unspecific-related outcomes (burnout, family satisfaction and psychological strain) were conducted to test the scale's internal consistency and criterion validity (Studies 2.1-2.3). In Studies 2.1-2.3 burnout was measured with six items from Walsh et al. (2019). Family satisfaction and psychological strain were assessed by three items from Kopelman et al. (1983) and Stich et al. (2019), respectively.

The 24-item DSS was translated and back-translated by bilingual, native English, German, Italian, and Japanese speakers (Van Auken et al., 2006). The participants in Studies 1.1-1.3 for the readability test were collected in graduate management courses at major universities in Germany, Italy, and Japan ($n_{Germany}$ = 96, n_{Italy} = 77, n_{Japan} = 63). Thus, beyond the readability test, in none of the studies was the DSS (with 24, 16 or 10 items) administered to a sample of students. For Studies 2.1-2.3, following Hall et al. (2021), data were collected via crowdsourcing platforms; see Table 1 for the data collection methods and sample descriptions. We note that there are more male than female participants in the Japanese sample, which is possibly a reflection of few women in full-time and managerial positions in Japan (Tanaka and Nagano, 2021).

	Germany	**Italy**	**Japan**
	Study 1.1	Study 1.2	Study 1.3
Purpose	Assessment of item readability in all three countries.		
Survey Design	Data collected by online questionnaire, with a link to the items sent by email to management students of large German / Italian / Japanese university.		
	N = 96	n = 77	n = 63
	Study 2.1	Study 2.2	Study 2.3
Purpose	Assessment of DSS properties / Development of 16-item and 10-item shortened scale / Assessment of measurement invariance of scale / Assessment of discriminant and criterion (predictive) validity.		
Survey Design	Data collected by online questionnaire, with a link to the questionnaire sent by email to panel members.		
Sample	n = 270 (aged 18 to 66 years) Professionals only 33% female Mean age = 38.9 (SD = 9.9)	n = 266 (aged 23 to 66 years) Professionals only 51% female Mean age = 42.6 (SD = 10.7)	n = 185 (aged 26 to 79 years) Professionals only 13% female Mean age = 53.8 (SD = 10.9)

Table 1. Data Collection Method and Sample Descriptions

As a first step of the scale validation and shortening process, content validity was assessed using scale experts in the three countries (none recommended changes) and by performing a readability test (Studies 1.1-1.3). Respondents from all three countries indicated the degree of comprehensibility of the items on a scale from "Not very easy to understand" [1] to "very easy to understand" [7]. Three items had a readability mean lower than five across the three countries (AS_4, CO_3 and CO_4) and were thus eliminated due to their moderate comprehensibility to respondents compared to the others items. Next, as part of the item-discriminant validity assessment (Yang and Yao, 2021), five items with low item-to-subscale correlations (ISC), item-to-total correlations (ITC) values and a mean factor loading below .80 were removed: AA_6, AA_5, FM_4, CO_1, and OV_3. The application of judgmental and internal criteria resulted in a preliminary short scale comprising 16 items. Given that short scales should have a length of around 10 items (Ziegler et al., 2014), we probed the 16-item short scale to determine wether there was scope for further shortening (Stanton et al., 2002). Again, internal criteria (ISC, ITC and factor loadings) were applied, which led to the elimination of six additional items (AS_1, AA_2, AA_3, FM_3, CO_5 and OV_1), resulting in a 10-item short DSS (Table 2).

	24-item DSS		16-item DSS		10-item DSS
	ISC ITC	CFA	ISC ITC	CFA	CFA
	n = 270 / 266 / 185				
Availability Stress					
α		.89/.89/.93		.88/.91/.92	
CR		.90/.89/.93		.88/.91/.92	.80/.89/.92
AVE		.86/.68/.76		.71/.76/.80	.67/.80/.85
(AS_1) My friends expect me to be constantly available online.	.78/.74/.82 .59/.55/.67	.85/.82/.85	.79/.79/.81 .58/.54/.67	.87/.83/.85	
(AS_2) For my friends, it is important that I am constantly available online.*†	.81/.84/.85 .61/.65/.71	.87/.93/.90	.80/.86/.85 .61/.65/.72	.89/.94/.92	.81/.95/.95
(AS_3) Most of my friends approve of me being constantly available online.*	.74/.81/.88 .63/.59/.69	.79/.86/.91	.71/.80/.87 .60/.59/.69	.78/.85/.92	.83/.84/.89
(AS_4) I feel a social obligation to be constantly available online.	.72/.62/.77 .73/.75/.85	.80/.68/.84			
Approval Anxiety					
α		.91/.93/.94		.96/.97/.95	
CR		.91/.93/.94		.96/.97/.95	.94/.96/.90
AVE		.65/.70/.74		.85/.89/.84	.90/.93/.82
(AA_1) I am nervous about how people will respond to my posts and photos.*	.88/.87/.83 .78/.76/.77	.97/.96/.87	.93/.95/.84 .78/.76/.81	.97/.97/.87	.96/.96/.92
(AA_2) I feel anxious about how others will respond when I share a new photo on social media.	.78/.83/.83 .68/.72/.74	.84/.91/.89	.83/.89/.87 .69/.72/.76	.84/.91/.90	
(AA_3) I feel nervous after I share a post or photo to see how others responded to it.	.85/.86/.89 .74/.74/.75	.94/.94/.94	.92/.92/.92 .75/.74/.77	.95/.94/.94	

(AA_4) I feel nervous about how others will respond when I post new updates on social media.*	.85/.88/.90 .75/.76/.79	.93/.96/.95	.90/.94/.92 .75/.76/.82	.93/.96/.96	.93/.96/.89
(AA_5) I put a lot of effort into finding or creating a photo that others will approve of when I post it online.	.66/.70/.81 .60/.68/.85	.58/.59/.77			
(AA_6) I put a lot of effort into composing messages and posts I share online.	.52/.63/.72 .43/.61/.81	.43/.52/.69			
Fear of Missing Out					
α		.89/.91/.94		.88/.92/.93	
CR		.88/.90/.94		.89/.92/.93	.94/.94/.90
AVE		.65/.70/.81		.74/.80/.81	.89/.89/.82
(FM_1) I fear my friends are having more rewarding experiences than me.*	.81/.85/.90 .69/.65/.84	.95/.94/.92	.85/.89/.88	.95/.95/.93	.96/.94/.89
(FM_2) I fear that others have more rewarding experiences than me.*	.78/.83/.82 .66/.64/.79	.93/.93/.85	.70/.66/.83	.93/.93/.88	.92/.95/.92
(FM_3) I get worried when I find out my friends are having fun without me.	.75/.82/.88 .74/.72/.83	.69/.80/.91	.84/.87/.83	.69/.80/.90	
(FM_4) I get anxious when I don't know what my friends are up to.	.67/.66/.85 .74/.68/.86	.61/.63/.91			
Connection Overload					
α		.91/.92/.93		.84/.88/.88	
CR		.91/.92/.92		.84/.88/.88	.74/.82/.86
AVE		.64/.67/.66		.64/.72/.72	.59/.69/.75
(CO_1) I have to check too many notifications.	.76/.71/.63 .68/.58/.70	.80/.73/.65			
(CO_2) I feel overwhelmed with the flow of messages/notifications on my phone.*	.81/.83/.80 .70/.76/.84	.85/.85/.87	.70/.76/.74 .67/.73/.81	.80/.83/.86	.76/.83/.87
(CO_3) It feels like there is always a reminder - like a flashing light or buzz - that there is some other message that I need to attend to.	.69/.67/.80 .71/.74/.81	.75/.73/.89			
(CO_4) I feel stress because I must sift through a lot of unimportant notifications to get to the important ones.	.78/.82/.82 .67/.74/.71	.82/.87/.81			
(CO_5) On top of the other things I must do, keeping up with notifications is a chore.	.78/.83/.79 .70/.75/.69	.82/.88/.76	.74/.79/.74 .67/.73/.65	.83/.87/.79	
(CO_6) I spend too much time responding to notifications/messages.*†	.70/.80/.87 .70/.74/.80	.75/.84/.88	.67/.78/.84 .67/.72/.76	.77/.85/.89	.77/.83/.86

Online Vigilance α CR AVE		 .90/.90/.90 .90/.90/.90 .70/.70/.70		 .88/.88/.85 .89/.88/.90 .72/.72/.76	 .85/.84/.89 .74/.73/.81
(OV_1) I must have my phone with me to know what is going on.	.81/.78/.76 .65/.62/.70	.86/.83/.82	.78/.75/.71 .65/.60/.67	.85/.83/.82	
(OV_2) I feel lost or "naked" without my phone.*	.76/.83/.83 .60/.62/.69	.80/.87/.90	.74/.80/.78 .59/.60/.66	.79/.86/.89	.76/.83/.90
(OV_3) I am constantly checking my phone for messages/notifications.	.76/.76/.68 .71/.68/.55	.81/.83/.71			
(OV_4) I feel socially unavailable when I do not have my phone.*†	.81/.77/.82 .70/.69/.71	.88/.82/.90	.81/.76/.67 .69/.68/.52	.91/.84/.90	.94/.88/.90
Model Fit					
$\chi 2$		605/698/826		186.80/169.64/ 226.22	34.35/45.83/ 28.86
df		240/240/240		94/94/94	25/25/25
$\chi 2$ / df		2.52/2.91/3.44		1.99/1.81/2.41	1.37/1.83/1.16
Tucker-Lewis index (TLI)		.92/.92/.87		.97/.98/.95	.99/.98/1.00
Confirmatory fit index (CFI)		.93/.93/.89		.97/.98/.96	1.00/.99/1.00
Root mean square error of approximation (RMSEA)		.08/.09/.12		.06/.06/.09	.04/.06/.03

Note: * = Items chosen for the 10-item short DSS; † = items relaxed for achieving partial metric invariance; CFA = confirmatory factor analysis; ISC = item-to-subscale correlation; ITC = item-to-total correlation; α = Cronbach alpha; CR = Composite reliability; AVE = Average variance extracted; values before the first (second) slash pertain to Germany (Italy), values after the second slash to Japan.

Table 2. Item-to-subscale Correlation, Item-to-total Correlation, Standardized CFA Loadings and Summary Psychometric Data 16-item and 10-item scale

Next, the psychometric properties of the original 24-item and the 16- and 10-item DS short scales were compared, using CFAs in AMOS (version 28). The Cronbach's α values, the composite reliability (CR), the average variance extracted (AVE), the factor loadings and model fit measures of all three scales for all three countries were satisfactory. As to the 24-item scale, all α values are above .88, indicating high reliability. The lowest CR value across all subscales is .88 and hence above the accepted threshold of .70 (Hair et al., 2011). Furthermore, all subscales have AVE values greater than .50 (Fornell and Larcker, 1981). Overall, the factor loadings mainly exhibit good values as well; only two items (AA_5 and AA_6) have loadings below .60 in the German and Italian sample. While the German and Italian model fits overall signal good values, the Japanese model shows slightly poorer fit with a root mean square error of approximation (RMSEA) value of .10. Nevertheless, the fit indices overall indicate a good fit of the measurement model to the data (Kline, 2005).

The extent to which construct dimensions differ from one another (discriminant validity) was assessed using the heterotrait-monotrait ratio of correlations (HTMT; Henseler et al., 2015), which is considered more reliable than the Fornell-Larcker criterion (Voorhees et al., 2016). For this purpose, the monotrait-heteromethod correlation (MT; mean value of the item correlation within one dimension) and the heterotrait-heteromethod correlation (HT; mean value of the item correlations between the two dimensions under investigation) is calculated. Dividing the respective HT correlation by the root of the two multiplied MT correlation yields the HTMT. Except for one HTMT value in the Japanese data, all other values, especially those of the shortened scales are below the HTMT threshold of .90 and thus indicate strong discriminant validity (Gold et al., 2001).

Considering the psychometric properties of the 16-item short scale, Cronbach's α (≥ .84), CR (≥ .84) and AVE (≥ .64) values show a good performance and exceed the required thresholds for all three countries. Compared to the full 24-item scale, the 16-item scale shows improved factor loadings, reaching values of at least .69, and model fit values: TLI ≥ .95, CFI ≥ .96, RMSEA ≤ .09. Turning to the 10-item scale, the CR and AVE values are above the recommended thresholds. Factor loadings are greater than .76 and, compared to the 16-item scale, the model fit is improved: TLI ≥ .98, CFI ≥ .99, RMSEA ≤ .06. Overall, the 10-item DSS exhibits greater average factor loadings than the 16-item scale. Taken together, the results speak to the robustness and good overall performance of the 10-item DSS across the three different countries.

Next, we investigate measurement invariance for the 10-item scale. Following Steenkamp and Baumgartner (1998), three levels of measurement invariance are considered and examined through a series of multigroup confirmatory factor analyses: configural, metric, and scalar invariance. The existence of configural invariance is the minimum requirement for demonstrating group invariance. In this CFA model all loadings and intercepts are freely estimated. Items within each subscale must have significant non-zero loadings on salient factors and should have zero loadings on non-salient factors. The good model fit (χ^2/df = 1.45, TLI = .99, CFI = .99, RMSEA = .03) and significant factor loadings for all groups indicate configural invariance for the 10-item scale.

Given that the 10-item DSS is also intended to explain relationships between constructs, the presence of metric invariance is also important. To determine metric invariance, the factor loadings for all three groups (i.e., country samples) are set equal. Using the configural invariance model as the base model for the χ^2-difference test, metric invariance cannot be found ($\Delta\chi^2$ = 39.46, Δdf = 20, $p < .05$). The occurrence of full metric invariance in three groups is an ideal situation that rarely occurs (Steenkamp and Baumgartner, 1998). An appropriate goal therefore is partial metric invariance which involves the stepwise relaxation of items. Three items were relaxed (see Table 2), resulting in a nonsignificant χ^2-difference test, indicating partial invariance ($\Delta\chi^2$ = 20.32, Δdf = 14, $p > .05$). Following Cheung and Rensvold (1999), these three noninvariant items were not deleted from the scale because of their high factor loadings and the potential compromise in construct validity. Since no full metric invariance could be established, scalar invariance can be neglected.

To demonstrate criterion validity (i.e., evaluation of the scale in relation to external criteria) of the 10-item DSS, we assess predictive validity (Walsh et al., 2019). Predictive validity exists when the scale is able to confirm a theoretically based relationship to a consequence. Amstad et al. (2011) show that work interference with family and family interference with work impacts several areas of life (work, family and domain unspecific). Based on Amstad et al. (2011) and the fact that mobile and social media continue to blur the line between work and private life, we predict a relationship between DS and work, family and domain unspecific outcomes. Next, we assess the 10-item DSS vis-à-vis the full 24-item scale in an effort to show that the 10-item scale has comparable explanatory power.

Using data from Studies 2.1-2.3 and an OLS regression (in SPSS version 28), burnout, family satisfaction and psychological strain were regressed on DS (measured with the full 24-item and 10-item scale). The results indicate significant and positive effects of DS on burnout and psychological strain in the three countries. Further, as expected, DS negatively affects family satisfaction; for the Italian sample, this relationship is only marginally significant ($p < .10$) though. While for the German and Italian samples similar levels of explained variance are observed, the Japanese data shows lower R^2 values. Compared to the full 24-item DSS, the 10-item DSS exhibits similarly high R^2 values, indicating high predictive power of the 10-item DSS (Table 3).

	10-item DSS		**24-item DSS**	
	B	R^2	B	R^2
DS → BO	.46*** / .42*** / .21**	.21 / .18 / .04	.46*** / .42*** / .19*	.21 / .17 / .04
DS → FS	-.26*** / -.12$^{(*)}$ / -.22**	.07 / .01 / .05	-.26*** / -.11$^{(*)}$ / -.21**	.07 / .01 / .04
DS → PS	.52*** / .45*** / .30***	.27 / .21 / .09	.52*** / .46*** / .28***	.27 / .21 / .08

*** $p < .001$ / ** $p < .01$ / * $p < .05$ / (*) $p < .10$; DS = Digital stress; BO = Burnout; FS = Family satisfaction; PS = Psychological strain; values before the first (second) slash pertain to Germany (Italy), values after the second slash to Japan.

Table 3. Predictive Validity Assessment

4 Discussion and Next Research Steps

Usage of mobile devices and social media applications can have negative consequences in terms of people perceiving DS. Hall et al. (2021) addressed this issue and the need for a reliable and valid measurement instrument by developing a 24-item DSS based on samples of U.S. adolescents and young adults. However, the cross-cultural validity of the DSS and its generalizability to working adults is yet to be established. Accordingly, we demonstrate the reliability and validity of the DSS with regard to employees in three different cultural settings, Germany, Italy, and Japan, establishing the cross-cultural validity of the original 24-item DSS. In addition, we propose a shortened 10-item DSS that has good psychometric properties and is cross-culturally valid.

Our results show that DS has an impact on burnout and psychological strain and a negative effect on family satisfaction. In examining these effects, we contribute to IS research by showing that DS is related to important employee outcomes. The results support the general notion that stress has a depleting effect on employees (Boyd et al., 2009), which should raise managers' awareness of the destructive effects of DS.

Because scale validation is a continuous process, more research is needed to show the scale is generalizable to other cultures and contexts. Our results show that the 10-item DSS performs well in Germany, Italy, and Japan. However, the CFA model fit of the Japanese sample is somewhat poorer as are the R^2 values of the regressions of the relationships between DS and the dependent variables. Cultural differences between Japan and the two western countries (Hofstede, 2023), as well as different ways of engaging with technology in Japan (Hosoda, 2021), offer an explanation for these differences. We intend to examine these differences in more depth in future studies. In addition, our findings might not generalize to the diverse collection of Asian countries (Ralston et al., 1997), especially economically less developed countries and those with dramatically different social media penetration rates, such as China or the Philippines (Hootsuite and We Are Social, 2023). Other Asian countries also differ culturally, such that they tend to be more hierarchical than Japan, as well as more collectivistic (e.g. Korea) (Hofstede, 2023). Continued studies should also assess the original 24-item and 10-item DSS in other, generally underresearched cultural contexts (e.g. Africa, South America). Finally, DS affects adolescents, young adults (Hall et al., 2021; Xie et al., 2022), and employees; it could exert influences in other behavioral contexts as well, such as among (online) consumers, which could be the focus of further research that relies on the short DSS.

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